

**AMENDMENTS TO THE CLAIMS**

**This listing of claims will replace all prior versions and listings of claims in the application:**

**LISTING OF CLAIMS:**

1. (currently amended): A digital echo cancellation device used for a high speed bidirectional communication system, comprising:

an adaptive beamformer comprising ~~a~~ finite impulse response filter for estimating an input receiving signal, the adaptive beamformer estimating a front portion of an echo path impulse response by adaptively estimating the input receiving signal; and

an orthogonalized infinite impulse response (IIR) filter for receiving an estimated signal output from the adaptive beamformer and estimating ~~a~~ tail portion of the echo path impulse on the basis of an IIR.

2. (original): The digital echo cancellation device of claim 1, further comprising:  
a first adder for subtracting the estimated signal output from the adaptive beamformer from a receiving signal to generate a first error signal; and  
a second adder for receiving the first error signal and subtracting the signal output from the orthogonalized IIR filter from the first error signal to generate a second error signal in which echo is canceled.

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3. (original): A digital echo cancellation device used for a high speed bidirectional communication system, comprising:

an adaptive beamformer comprising a finite impulse response filter for estimating an input receiving signal, the adaptive beamformer estimating a front portion of an echo path impulse response by adaptively estimating the input receiving signal;

an orthogonalized infinite impulse response (IIR) filter for receiving an estimated signal output from the adaptive beamformer and estimating a tail portion of the echo path impulse response on the basis of an IIR;

a first adder for subtracting the estimated signal output from the adaptive beamformer from a received transmission signal to generate a first error signal; and

a second adder for generating a second error signal from which echo is canceled by subtracting the signal output from the IIR filter from the first error signal.

4. (original): The digital echo cancellation device of claim 3, wherein the orthogonalized IIR filter comprises:

a first stage comprising a first adder for receiving the estimated signal output from the adaptive beamformer and a first delay for delaying an output signal from the first adder, wherein the adder adds the estimated signal to a signal obtained by multiplying an output signal from the first delay with a coefficient  $r$ ; and

a plurality of additional stages which are serially connected to each other, wherein a first one of the additional stages is connected to an output signal from the first stage and comprises a

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second delay for delaying the output signal from the first stage, a third delay, and a second adder for adding a signal obtained by multiplying the output signal from the first stage with a coefficient  $-r$ , an output signal of the second delay, and a signal obtained by multiplying an output signal from the third delay with the coefficient  $r$ .

5. (currently amended): The digital echo cancellation device of claim 3, wherein output signals from ~~the~~ ~~from~~ each of the additional stages are multiplied by coefficients and then provided to the second adder to generate the second error signal.